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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/726,248	12/02/2003	James E. Watson	59376US002	3537
32692 7590 09/19/2007 3M INNOVATIVE PROPERTIES COMPANY PO BOX 33427 ST. PAUL, MN 55133-3427			EXAMINER GUHARAY, KARABI	
			ART UNIT 2879	PAPER NUMBER
			NOTIFICATION DATE 09/19/2007	DELIVERY MODE ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	<b>Application No.</b> 10/726,248	<b>Applicant(s)</b> WATSON ET AL.	
	<b>Examiner</b> Karabi Guharay	<b>Art Unit</b> 2879	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on RCE, filed on 7/25/07.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,3-12,14-26,28-34 and 36-39 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-12,14-26,28-34 and 36-39 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>8/17/07 &amp; 9/10/07</u> . | 6) <input type="checkbox"/> Other: _____  |

***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 7/25/07 has been entered.

Amendments, filed on 7/25/07 have been entered.

Claims 2,13, 27 and 35 have been canceled.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 12, 14-17, 25-26, 31-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Durocher et al. (US 6733711).

Regarding claims 12, 26, Durocher discloses a light source (Fig 11) comprising two or more LED dies (a plurality of LED dies 59) arranged in array capable of emitting LED light, two or more optical couplers (plurality of lens 67 & 31) for coupling light from respective LED dies (lines 57-59 of column 8), an intermediate layer (65) disposed between the LED dies and the coupler (67), the intermediate layer being transparent to the LED light (lines 35-36 of column 8) and a phosphor layer disposed on

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the intermediate layer between intermediate layer and the coupler (phosphor layer is formed on the inner surface of 67, see lines 63-64 of column 8). However, Durocher et al. do not disclose a continuous intermediate layer disposed between the array of LED dies and the couplers, instead provide discrete intermediate layer for each of the LED.

However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a continuous intermediate layer covering all the LED dies of the array, instead of individual layers for each LED dies because it is more easier or convenient to put one continuous layer over all the LEDs for manufacturing purposes to get the predictable results.

Regarding claim 14, Durocher discloses that the LED dies are encapsulated (lines 30-32 of column 8).

Regarding claim 15 & 31, Durocher discloses that the LED dies are disposed on a substrate (41 of Fig 5).

Regarding claims 16 & 32, Durocher discloses at least one stand off disposed between intermediate layer and the substrate (see Fig 5).

Regarding claim 17, Durocher discloses the coupler (31) formed with aperture having reflective sidewalls (36, 39 of Fig 3).

Regarding claim 25, Durocher discloses that the electric power is applied to the LED (which inherently provides a power supply, see lines 50-52 of column 1).

Claims 1, 3-9, 11, 18-23, 28-30, are rejected under 35 U.S.C. 103(a) as being unpatentable over Durocher et al. (US 6733711), and further in view of Miller et al. (US 6155699).

Regarding claim 1, Durocher et al. disclose a light source (Fig 11) comprising an array of LED dies (a plurality of LED dies 59) capable of emitting LED light; optical couplers (plurality of lens 67) for coupling light from respective LED dies (lines 57-59 of column 8), phosphor patches (LED dies 59 contains a phosphor layer on top of it, see lines 61-62 of column 8) disposed between the LED dies and the optical coupler (67) to convert at least a portion of the LED light propagating to the optical coupler (lines 41-48 of column 8).

But Durocher fails to disclose a continuous intermediate layer disposed between LED dies and the phosphor patches, the continuous intermediate layer transmitting LED light and reflecting light converted in the phosphor, intermediate layer having a first side facing the LED and a second side facing the coupler, and phosphor is disposed on the second side of the intermediate layer.

However, In the same field of LED, Miller discloses a single LED device (see Fig 2 & 6) having an intermediate layer (DBR mirror 30, 46) disposed between LED die (12, 42) and the phosphor patches (36, 48) transmitting LED light and reflecting light converted in the phosphor, intermediate layer (30, 42) having a first side facing the LED and a second side facing the coupler (22 or 50, see Fig 2), and phosphor is disposed on the second side of the intermediate layer (lines 10 of column 5 -line 45 of column 6 ).

Further Miller teaches that having a wavelength selective reflector (in this case DBR mirror 30, 46) enhances the light output by allowing high percentage of primary light to reach phosphor and reflecting much of the converted secondary light that is emitted towards the LED (lines 65 of column 2-line 9 of column 3).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate a continuous wavelength selective reflector layer between the array of LED s and the phosphor, as disclosed by Miller in case of a single LED, in the array of LED device of Durocher to cover all the LEDs of the array in order to improve light output from the array device.

Regarding claim 3, Durocher discloses that the LED dies are encapsulated (lines 30-32 of column 8).

Regarding claim 4, Durocher discloses that the LED dies are disposed on a substrate (41 of Fig 5).

Regarding claim 5, the combined structure of Durocher & Miller discloses at least one stand off disposed between intermediate layer and the substrate (see Fig 5 of "711).

Regarding claim 6, Durocher discloses the coupler (31) formed with aperture having reflective sidewalls (36, 39 of Fig 3).

Regarding claim 7, Durocher discloses that the phosphor patches register with respective apertures (35).

Regarding claim 8, the combined structure of Durocher & Miller discloses that the phosphor patches extend into the apertures from the intermediate layer (since the phosphor layer is positioned above the intermediate layer with in the aperture (35).

Regarding claim 9, 22 & 30, Miller discloses a reflecting layer (side wall of 14) disposed to reflect LED light that has passed through the phosphor layer back to the

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phosphor layer back to the phosphor layer (since reflecting layer 14 extends above the phosphor patch 52). The same reason for combining art as in claim 1 applies.

Regarding claim 11, Durocher discloses that the electric power is applied to the LED (which inherently provides a power supply, see lines 50-52 of column 1).

Regarding claims 18 & 28, Miller et al. disclose that the phosphor layer (36) is provided on the intermediate layer (30) and positioned corresponding to areas of the intermediate layer illuminated by LED die (see Fig 2).

Regarding claims 19-20, Miller et al. disclose that the coupler (14) is formed in aperture through the coupler sheet and the phosphors are registered with the apertures (Fig 2), and phosphor patch (36) register with the aperture and extends into the aperture from the intermediate layer (Fig 2).

Regarding claims 21 & 23, Miller et al. disclose that the intermediate layer (30) reflects converted wavelength (lines 40-45 of column 6).

Regarding claim 29, Miller et al. disclose that the first layer (30) reflects light converted by the phosphor to a longer wavelength than the wavelength of the LED light (lines 17-33 of column 7).

Claim 24 rejected under 35 U.S.C. 103(a) as being unpatentable over Durocher et al. as applied to claim 12 above, and further in view of Ota et al. (US 6943380).

Regarding claim 24, Durocher teaches all the limitations of claim 24 except for a set of optical fibers disposed to receive light from the coupler.

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However, Ota et al. discloses LED light source and further teaches the use of optical fibers for extracting and optical transmission of light emitted from LED (lines 28-35 of column 11).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use set of optical fibers in order to transmit light from the LED array.

Claim 10 rejected under 35 U.S.C. 103(a) as being unpatentable over Miller & Durocher et al. as applied to claim 1 above, and further in view of Ota et al. (US 6943380).

Regarding claim 10, combined structure of Miller & Duracher et al. teach all the limitations of claim 10 except for a set of optical fibers disposed to receive light from the coupler.

However, Ota et al. discloses LED light source and further teaches the use of optical fibers for extracting and optical transmission of light emitted from LED (lines 28-35 of column 11).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use set of optical fibers in order to transmit light from the LED array.

Claims 33-34, 36-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimizu et al. (US 6949772), and further in view of Miller et al. (US 6155699).

Regarding claims 33-34, 39, Shimizu et al. disclose a method of assembling a light source comprising providing a plurality of LED dies arranged in a regular array



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patterns on a LED subassembly and attaching the LED subassembly (see Fig 1a & 1b) to a first layer (23) comprising holes (32a) disposing a continuous intermediate layer (24) providing reflecting layer and the transparent mold (24) which is substantially transparent to the LED light (lines 7-16 of column 2), positioning the intermediate layer over the LED dies so that light passes through the first layer (23), where first layer comprises a plurality of stand-offs (24) and attaching the first layer comprises attaching the stand-offs to the LED subassembly (lines 43-57 of column 1).

However, Shimizu et al. fails to disclose a layer of phosphor as patches on a surface of the continuous intermediate layer to areas where light passes from the LED dies, and the first layer transmits LED light but reflects light that is wavelength converted in the phosphor.

Miller et al. in the same field of LED lighting disclose a light source (see Fig 2) comprising LED die (12), an intermediate layer (28, 30) disposed over the LED die, the intermediate layer (28, 30) layer being substantially transparent to the LED light (lines 9-18 of column 6), the LED light propagating through the first layer from a first side to a second side and a phosphor layer disposed as patch (36) on the second side (lines 62-67 of column 5), the first layer transmits LED light but reflects light that is wavelength converted in the phosphor (lines 10-45 of column 6). Miller further teaches that such DBR mirror (30) and the disposition of phosphor (36) on the DBR mirror improves the flux of light emitted from the light source (lines 58 of column 20-line 9 of column 3).

Thus it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate a phosphor layer (36) as disclosed by Miller et al. in the device of Shimizu et al, since this will provide improved light emission.

### ***Response to Arguments***

Applicant's arguments filed 7/25/07, in regards to rejection of claims 33,34 & 36-39 have been fully considered but they are not persuasive.

Shimizu does disclose a continuous intermediate layer (24). But does not disclose patches of phosphor on the surface of the intermediate layer. Miller teaches the use of phosphor patches.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

### ***Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karabi Guharay whose telephone number is 571-272-2452. The examiner can normally be reached on Monday-Friday 9:00 am - 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimeshkumar D. Patel can be reached on 571-272-2457. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

*K. Guharay*  
Karabi Guharay  
Primary Examiner  
Art Unit 2879

*9/12/07*